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The Nutrition and Feeding of Horses

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All types of horses—whether for pleasure, work, sport or show—must be properly fed if they are to grow, reproduce, perform or simply look as they were intended to look. "Properly fed" means supplying the horse with the right amounts of the right feedstuffs to meet his daily need for energy, protein, vitamins, minerals and water.

This publication is designed to help you understand the basics of good horse nutrition then feed the ration that is "best" for your animals and your situation. Discussed are: nutrient needs of horses and how they can be met, types of suitable feedstuffs and their contributions to the diet, management tips for feeding, and suggested balanced rations for the various categories of horses.

BASIC NUTRIENTS FOR HORSES

"Basic" nutrients are those that are absolutely necessary in the diet. Of course, the horseman doesn't dump energy, protein, vitamins and minerals into a feed bucket or hay bunk, but rather provides them in the form of corn, oats, hay and supplement. Then the horse, through digestive processes, breaks down these feedstuffs to release the nutrients for the specific functions they perform in the body.

Following is a brief description of the four basic nutrients, why they are important and how they are "fed" to the horse.

Energy

Energy is the "fuel" that runs the machinery of the body. Every horse needs a certain amount simply to keep the body going; this is referred to as the *maintenance need.* However, a horse must receive additional energy if it is to grow, run, reproduce, lactate or withstand cold weather. Typical sources of energy for the horse are corn, oats, hay and pasture.

Protein

Like energy, protein is necessary for the proper functioning of the body. However, whereas energy is a non-specific fuel and used wherever necessary, protein is specifically involved with muscle formation in the growing horse, with development of the unborn foal in the pregnant mare, with milk production in the lactating mare, with maintenance of existing muscles and organs, and other important functions.

While corn, oats, common hay and pasture supply some protein to the horse, richer sources are soybean meal, linseed meal, dehydrated alfalfa meal, good alfalfa hay and green pasture.

Vitamins

Vitamins, essentially, are the additives that enable the horse to properly utilize energy and protein. They are required in only very small amounts. In most cases, vitamin needs may be met merely by feeding the recommended amounts of corn, oats, hay and pasture to satisfy energy and protein needs. However, for rapidly-growing horses, mares in late pregnancy, lactating mares, breeding stallions, race horses, continuously-stalled horses or those being wintered on poor-quality hay or pasture, vitamin supplementation should be considered.

A number of excellent commercially-prepared vitamin supplements are on the market. Most popular are the powdered or pelleted products that supply the daily needs of A, D, E and B-complex vitamins by top-dressing the grain ration with 1 or 2 ounces according to manufacturer's directions.

Vitamin A is important in maintaining proper vision, healthy skin and haircoat, and strong, healthy hoof growth; in efficient reproduction; and in resistance to respiratory diseases. Horses requiring vitamin A supplementation should receive 20,000-30,000 IU daily, in addition to what they already get from grain and roughage.

Vitamin D is required for proper utilization of the "bone minerals," calcium and phosphorus. Deficiency of vitamin D results in deformed, weak bones and joints in young horses and brittle, fragile bones in adult horses. Those animals kept indoors and not otherwise exposed to the sun's rays (which naturally manufacture vitamin D in the skin) should be supplemented with 2,000-3,000 IU daily.

Vitamin E in the horse affects reproductive efficiency, livability of the new-born foal, rapid muscle development and helps prevent the "tying-up" syndrome. While natural feedstuffs probably contain sufficient vitamin E to meet the needs of most horses, supplementation up to 1,000 IU per day is recommended for breeding animals, animals in hard training and rapidly-growing ones.

B-complex vitamins are involved with the manufacture and release of energy, functioning of the nervous system and nerve-muscle coordination. A well-formulated ration, together with the natural manufacturing process in the cecum, probably provides adequate levels of the B-complex. But for breeding horses, growing horses and those in training, additional amounts should be fed.

Another way to provide supplemental vitamins, besides commercial top-dressing, is to have the feed mill add the desired vitamins when they mix the ration. *Each 100 pounds of ration* should provide the following: 500,000 IU vitamin A, 50,000 IU vitamin D, 15,000 IU vitamin E, 600 mg. thiamine, 400 mg. riboflavin, 400 mg. pantothenic acid and .3 mg. vitamin B_{12}.

Minerals

Although the horse requires a number of minerals for its well-being, usually one only needs to be concerned about salt, calcium, phosphorus and iodine. The others will be supplied by any ration that adequately meets the animal's energy and protein requirements.

Salt and iodine are usually added to the diet by blending a trace-mineralized salt into the grain mix. Most horses need a minimum of 1 ounce of salt per day. This can be met by adding 1 percent salt to the grain mix, plus providing salt free-choice in block, brick or crumble form. The advantage of a brick is that it can be placed in an individual feed bucket. But be sure to crush any chunks walnut size or larger as they develop, to prevent choking.

Almost any grain-hay or grain-pasture ration that maintains the condition of the horse will probably supply enough calcium and phosphorus, but possibly not in the proper proportions. Ratio of calcium to phosphorus is very important in animal diets. On a *total daily feed intake basis,* that ratio should be 1½ to 2 parts calcium to 1 part phosphorus. The suggested rations presented later insure both proper amounts and proportion of calcium to phosphorus.

To guard against any possibility of insufficient intake of calcium and phosphorus from a ration or pasture, provide a free-choice mixture of either 2 parts steamed bonemeal and 1 part trace-mineralized salt *or* 2 parts dicalcium phosphate and 1 part trace-mineralized salt.

TYPES OF FEEDSTUFFS FOR HORSES

There seems to be numerous old wives' tales when it comes to the question of feedstuffs for horses. Some examples are: "horses need timothy and oats," or "alfalfa hay will destroy a horse's kidney," or "corn is too hot for horses."

To unquestioningly submit to these fallacies can deprive the horseman of some excellent sources of feed. Actually, *quality* and *physical form* (whole, cracked, ground) of a feedstuff are far more important to the horse than "what" it is. Oats, corn, barley, timothy hay, alfalfa hay, soybean meal, etc. should be viewed merely as carriers or sources of basic nutrients; there's nothing "magical" about any one of them.

Following are common feedstuffs readily available in Indiana, their primary contribution to and recommended upper limit in the daily ration.

Corn. Corn is an energy source that can safely make up all or any part of the grain portion of a daily ration. It can be fed on-the-cob, shelled, cracked, coarse-ground or as corn-and-cob meal.

Oats. Another energy source is oats which, like corn, can supply all or any part of the grain portion of a ration. It can be fed whole, crimped or steamed-rolled. (*Note:* When switching from corn to oats, increase pounds fed by 20 percent; if switching from oats to corn, decrease by 20 percent.)

Soybean Meal. As a protein source, soybean meal is usually fed at levels up to 1 pound per head daily. However, lactating mares and rapidly-growing youngsters, which have high protein demand, can be fed rations containing 25 percent soybean meal. The pelleted form increases palatability for some horses.

Linseed Meal. Feeding levels for linseed meal, also a protein source, are comparable to that of soybean meal. Palatability is likewise increased by feeding in pellet form.

Wheat Bran. Wheat bran has a laxative effect and, when bulk is desired, can make up any percent of the ration but should not exceed 2 pounds a day.

Dehydrated Alfalfa Meal. An excellent source of vitamin A, "dehy" also has a moderately-high protein content. It is usually fed at a level of 5 to 7 percent of the daily grain ration.

Molasses. Fed primarily to increase palatability and minimize dustiness, molasses should be mixed to constitute 3 to 5 percent of the daily grain ration.

Grass Hay. Grass hay is likely to come from stands of timothy, orchardgrass, bromegrass or bluegrass, alone or in combination, and fed as a source of energy. The entire roughage portion of a horse's diet can safely be made up of grass hays. If

specifically set aside, fertilized and managed for hay production, these grasses are also a significant source of protein. However, if the hay is merely made from horse pasture mowed at the end of the grazing season, it will be low in protein.

Alfalfa Hay. When free of mold and dust, alfalfa hay is unquestionably the best roughage the horseman can choose, and it can safely make up the entire roughage ration. In addition to supplying energy, 8-10 pounds of alfalfa per day meet all or nearly all of a horse's protein needs.

(Notes: (1) When switching from grass hay to alfalfa hay, do so gradually over about a 10-day period as follows: day 1—9 lbs. grass hay + 1 lb. alfalfa hay; day 2—8 lbs. grass + 2 lbs. alfalfa; day 3—7 grass + 3 alfalfa, and so on. (2) When alfalfa hay is in short supply and expensive, consider mixing grass and alfalfa hay by supplying some of each at each feeding.)

Pasture. When green and growing, pasture should supply total energy, protein, mineral (except salt) and vitamin needs to all horses except race horses; rapidly-growing weanlings, yearlings and 2-year-olds; lactating mares; and mares in the last 3 months of pregnancy. Supplemental energy and protein will benefit these categories and all classes of horses when pasture is dry and during late fall and winter.

Mare's Milk. This is certainly the easiest, cheapest and best source of basic nutrients for the foal. Milk production of most mares begins to diminish when the foal is approximately 3 months old; therefore, be sure it is consuming 6-8 pounds of creep feed per day by that time.

FEEDING MANAGEMENT GUIDELINES

Before discussing specific rations, let's look briefly at management practices that should accompany good horse nutrition.

1. Feed only mold-free hay and grains, and make every effort to minimize dust. Lightly watering the feed will help.

2. Feed twice a day, providing half the grain at each feeding and perhaps two-thirds of the roughage at the evening feeding.

3. Feed at the same time each morning and evening. Horses are creatures of habit, and a slipshod feeding schedule can affect their disposition.

4. Don't make abrupt changes in ration make-up, but rather alter it gradually over a 7- to 10-day period.

5. Provide *free* exercise daily; and if possible, plan on 30 minutes to 1 hour of *forced* exercise per day.

6. Allow at least 1 hour after feeding before working a horse, and 1 hour after working before feeding.

7. Fresh water should be available at all times. If not possible, fill the water buckets at least twice a day. An idle adult horse will consume 12-14 gallons daily. Hot weather, hard work and lactation can nearly double this amount.

8. Keep feed tubs, water buckets and mangers clean. Saliva, feed particles and warmth provide an excellent environment for bacterial growth.

9. Check the manure routinely for consistency, color and amount of undigested grain. "Floating" or rasping (usually a veterinary procedure) of the horse's molars and pre-molars, as necessary, will improve digestion.

10. Maintain a constant worming program. A non-wormed horse needs at least 10 percent more feed daily to maintain condition; this can add up to between $15 and $35 a year.

11. Feed all ration ingredients on a weight basis. A 1-pound coffee can filled with the following feedstuffs will weigh: shelled corn, 1¼ lbs.; cracked corn, 1 lb.; oats, ¾-1 lb.; protein meals, 1 lb.; wheat bran, ½ lb.; molasses (dry), 1 lb.; and sweet feeds, 1 lb. Most baled hays weigh 40-50 pounds per bale.

12. To insure proper amounts of a balanced ration, feed according to animal weight. A simple way to determine actual weight is to weigh the horse and trailer (1), then trailer separately (2), and subtract (2) from (1). If, for some reason, the horse can't be weighed, have an expert horseman in your area estimate its weight. If both options are unavailable, assume the following weights: mares, geldings and stallions from 14-2 to 15-1 hands—1,100 lbs.; mature ponies under 46 inches—500 lbs.; mature ponies 52-56 inches—800 lbs.; weanling horse foals—600 lbs.; and weanling pony foals—300 lbs.

SUGGESTED BALANCED RATIONS

Anyone concerned about the economics of horse-owning should learn to "balance" a ration. A balanced ration means that each horse gets exactly what it needs—no less (which could affect health and performance) and no more (which would waste money). However, until he masters the "art" of ration balancing with type and quality of feedstuffs available, a horseman would be wise to use the following general balanced daily ration "formulas" for the various categories of horses.

(Note: Composition of the 10%, 12%, 14% and 16% protein grain mix portions of these rations is given in Table 1. Also, the hay portion is assumed to be 50% alfalfa-50% grass hay; if planning on total legume hay, remember the 7- to 10-day adjustment period.)

For Mature Idle Horses: Pasture free-choice, no grain or hay; *or* pasture during the day and 5 lbs. hay per animal in stall at night; *or* 2 lbs. hay per 100 lbs. body weight and no pasture.

For Working Horses: If worked 2 hours—½ lb. 10% protein grain mix + 1½ lbs. hay, per 100 lbs. body weight; if worked 4 hours—1 lb. 10% protein

Table 1. Suggested balanced corn- and oat-base grain mixes supplying 10, 12, 14 and 16 percent protein.

Ingredient	10% protein		12% protein		14% protein		16% protein
	Corn base	Oat base	Corn base	Oat base	Corn base	Oat base	Oat base
	percent of total ration						
Corn	50.0	33.0	54.0	28.0	50.0	25.0	22.0
Oats	38.0	55.0	26.0	54.0	25.0	51.0	46.0
Dehydrated alfalfa meal	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Soybean meal	---	---	8.0	6.0	13.0	12.0	20.0
Molasses	4.5	4.5	4.5	4.5	4.0	4.0	4.0
Limestone	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Dicalcium phosphate	.5	.5	.5	.5	1.0	1.0	1.0
Trace-mineralized salt	1.0	1.0	1.0	1.0	1.0	1.0	1.0

grain mix + 1-1¼ lbs. hay, per 100 lbs. body weight; if worked 6 hours—1½ lbs. 10% protein grain mix + 1 lb. hay, per 100 lbs. body weight. (Hay can be omitted if good pasture is available free-choice).

For Breeding Stallions: 1 lb. 10% protein grain mix + 1-1¼ lbs. hay, per 100 lbs. body weight. Depending on animal temperament, adjust amount of grain up or down as condition indicates. If pasture breeding on lush grass, supplemental feeding may not be necessary.

For Mares in Last 90 Days of Pregnancy: 2 lbs. hay + ½ lb. 12% protein grain mix, per 100 lbs. body weight.

For Mares at Peak of Lactation: 1½-2 lbs. hay + 1 lb. 14% protein grain mix, per 100 lbs. body weight.

Sucklings and Weanlings: Creep feed beginning at 1 month with 1½ lbs. 16% protein grain mix per animal per day, then increase gradually up to 1¼ lbs. per 100 lbs. body weight by weaning time; after weaning, feed 1 lb. 16% protein grain mix per 100 lbs. body weight + free-choice hay until yearlings.

Yearlings and Rapidly-Growing 2-Year-Olds: 1 lb. 14% protein grain mix + either pasture free-choice or 1-2 lbs. hay, per 100 lbs. body weight. Adjust grain amount as conditions indicate.

RELATED PUBLICATIONS

Single copies of the following Purdue Extension publications are available free to Indiana residents from their county Extension offices or from the Agricultural Publications Office, AGAD Building, Purdue University, West Lafayette, IN 47907:

"Fencing for Horses in Indiana" (AS-418)

"Trail Riding Manual for Indiana Horsemen" (AS-423)

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